



The AIR Professional File

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Supporting quality data and
decisions for higher education.



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RESEARCH

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**FEATURING THREE ARTICLES FROM
NCES DATA INSTITUTE TEAMS**

LETTER FROM AIR'S EXECUTIVE DIRECTOR

I am pleased to introduce three outstanding articles for the Spring 2023 issue of the *AIR Professional File*. Each of these papers explore different facets of the important and complex interdependencies among students, institutions, and disciplines. All three articles use federal datasets and are based on research projects started as part of the National Center for Education Statistics (NCES) Data Institute. The NCES Data Institute (Institute) is a long-standing partnership between NCES and AIR to provide an intensive introduction to federal educational datasets and research methodology. The training is supported by NCES and is developed and operated by AIR.

For over two decades, the Institute has provided opportunities for IR/IE professionals, graduate students, faculty, and other researchers to learn more about the rich array of information within the NCES datasets as well as methodologies and tools to use the datasets effectively. The research that has emerged from this learning and exploration has fueled a multitude of studies that, in turn, have increased our understanding on topics such as student enrollment and graduation patterns; the impact of institutional actions and support; and much, much more. Research partnerships have been forged and lasting connections and friendships have developed among participants.

The Institute has also been the catalyst for journal articles, dissertations, conference presentations, and policy papers that have supported and advanced the career journeys of the participants themselves. The

successful completion of my own dissertation was supported by the knowledge, skills, and connections I gained through participation in one of the early Institutes. Thus, I personally attest to its value and impact.

The three papers in this volume add to the impressive record of Institute participants contributing new and meaningful insights to higher education research through the use of federal datasets.

Andrea Chambers, Hollie Daniels, John Dooris, Arlyn Y. Moreno Luna, and Sean Riordan use the Beginning Postsecondary Students Longitudinal Study (BPS) to explore the question of whether adult students who begin their postsecondary education at a 2-year institution are more or less likely to attain a bachelor's degree as compared to adult students who begin at a 4-year public or 4-year private nonprofit institution. They found no differences in the likelihood of persistence to a bachelor's degree across the various institution types - after controlling for common predictors of persistence such as high school GPA, receipt of Pell Grants, and other demographic data. They also found no differences in persistence for adult students when examining different levels of enrollment intensity (full time and part time).

Sooji Kim, Sarah Parsons, Kimberly Y. Franklin, and Alyse Gray Parker use IPEDS data and a conceptual framework of "servingness" to study the extent to which Hispanic-Serving Institutions (HSIs) serve

LETTER FROM AIR'S EXECUTIVE DIRECTOR

Latinx students as measured by 6-year graduation rates. Their findings suggest that the 6-year graduation rates for Latinx students are lower at HSIs as compared to non-HSIs, even when taking into account the proportion of Latinx students and Latinx faculty. They also found that increased institutional spending on research, academic support, and institutional support are positively associated with graduation rates.

Trang C. Tran, Jon Williams, Kyndra V. Middleton, Angela Clark-Taylor, and Christen Priddie use the High School Longitudinal Study (HSLS) to examine the influences that gender, math identity, science identity, career expectations at age 30, and high school STEM credit completion have on Black, Indigenous and People of Color (BIPOC) students' postsecondary major (STEM or non-STEM). The results of their study indicate that gender, science identity, career expectations at age 30, and high school STEM credit completion significantly predict the odds of postsecondary enrollment in a STEM major.

I hope your understanding is expanded and your curiosity sparked by these excellent papers.

Sincerely,
Christine M Keller
AIR Executive Director & CEO

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How Do Hispanic-Serving Institutions Serve Latinx Students? A Panel Analysis of Institutional Characteristics and 6-Year Graduation Rates

Sooji Kim, Sarah Parsons, Kimberly Y. Franklin, Alyse Gray Parker

About the Authors

Sooji Kim recently completed her doctorate in higher education at the Center for the Study of Higher and Postsecondary Education at the University of Michigan. She is currently a senior research associate at the Belk Center for Community College Leadership and Research at North Carolina State University. Sarah Parsons is a senior research analyst at the University of Missouri. Kimberly Y. Franklin is an education librarian at California State University, Los Angeles; her ORCID research identification is <https://orcid.org/0000-0001-6086-3287>. Alyse Gray Parker is associate director of federal relations at the University of Iowa.

Acknowledgments

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Abstract

This study builds on the body of research on Hispanic-Serving Institutions (HSIs) and Latinx student outcomes, and uses Garcia et al.'s (2019) conceptual framework of *servingness*. Using multiple years of data from the Integrated Postsecondary Education Data System (IPEDS), we examined the extent to which HSIs serve Latinx students in terms of 6-year graduation rates at not-for-profit 4-year institutions. Key findings suggest that the average 6-year graduation rates for Latinx students are lower at HSIs than at non-HSIs.

HSIs and non-HSIs have vastly different institutional characteristics, such as the organizational environment experienced by students and the structural capacity of institutions to respond to students' needs. Moreover, we find that, at HSIs, neither the share of Latinx students nor the share of Latinx instructional staff promote Latinx students' 6-year graduation rates. The graduation rates, however, are positively associated with increased institutional spending on research, academic support, and institutional support, which are organizational structures that can respond to students' needs for academic success, as well as with higher institutional selectivity approximated by an offering of no remedial courses.

Keywords: Hispanic-Serving Institutions; minority-serving institutions; Latinx students; college outcomes; college success

INTRODUCTION

Hispanic-Serving Institutions (HSIs) are among the fastest-growing types of higher education institutions in the United States. HSIs are not-for-profit degree-granting institutions with “an enrollment of undergraduate full-time equivalent students that is at least 25 percent [Latinx] students” (U.S. Department of Education, n.d.-a) and are eligible for federal designation and grant programs such as the Title V program (Garcia, 2017).¹ According to the Hispanic Association of Colleges and Universities (HACU, 2022), there were 559 institutions with HSI designation in 2020, enrolling about two thirds of all Latinx undergraduate students, which is an increase of 248 institutions since 2010. Geographically, HSIs are mostly located in the western and southwestern United States, yet 80% of them are located in California, Florida, Illinois, New Mexico, New York, Texas, and Puerto Rico (HACU, 2022; Hurtado & Ruiz Alvarado, 2015). HSIs have a growing importance in advancing college access and success for Latinx students since the Latinx college-going population is rapidly increasing; that increase, in turn, has contributed to the growth of eligible HSIs (Garcia, 2017; Laden, 2004).² Many scholars have documented the historical origin of HSIs, which dates back at least 30 years (e.g., Garcia, 2020; Gasman et al., 2015; Laden, 2004; Núñez et al., 2015; Santiago, 2006; Vargas & Villa-Palomino, 2019). A large majority of HSIs were initially predominantly White institutions that became Latinx-serving as a result of significant increases in Latinx students’ college enrollment commensurate with demographic changes. Yet, unlike other minority-serving institutions such as Historically Black Colleges and Universities or

Tribal Colleges and Universities, both of which were founded as a result of *de jure* segregation and with an explicit mission to serve their respective student populations, HSIs were not founded with a specific mission of serving Latinx students (Contreras et al., 2008; Hurtado & Ruiz Alvarado, 2015; Núñez et al., 2015). Rather, HSI designation has been largely defined by an enrollment threshold.

After an intensive period of advocacy and activism that began in the early 1980s from stakeholders concerned with Latinx students’ access to higher education and their upward mobility, HSIs received federal designation with the reauthorization of the Higher Education Act of 1992. This designation enabled HSIs to apply for official recognition and to compete for various federal grants such as the Title III program for science, technology, engineering, and mathematics (STEM) education at HSIs or to apply for the Title V program “to assist with strengthening institutional programs, facilities, and services to expand the educational opportunities for [Latinx] Americans and other underrepresented populations” (U.S. Department of Education, n.d.-b). As Dayton et al. (2004) noted, HSIs indeed have become institutions for “[encountering] opportunities for unique learning environments, access to special funding, and the potential to be instrumental in [Latinx students’] educational attainment” (p. 29). Despite federal recognition, support for HSIs, and an accumulation of research on HSIs, scholars have indicated that what it means to serve Latinx students remains an open question and an opaque concept that lacks specific federal guidelines for promoting strategies to serve Latinx students (Garcia et al., 2019; Santiago, 2006).

1. Federal grant program eligibility such as for Title V requires HSIs “to ensure that at least 50 percent of their [Latinx] students are low-income individuals” (Dayton et al., 2004, p. 29). In this paper we refer to Hispanic/Latino as Latinx, and to Native Hawaiian/Other Pacific Islander as Indigenous.

2. HACU (2022) estimates that Latinx student enrollment in higher education will be more than 4.1 million by 2026.

In this study, we used Garcia et al.'s (2019) framework of servingness to investigate the extent to which HSIs serve Latinx students; in doing so, we focused on Latinx students' 6-year graduation rates. Specifically, we longitudinally examined an overall trend in Latinx students' 6-year graduation rates at not-for-profit degree-granting institutions by control and HSI designation status. We further investigated how various institutional characteristics (e.g., organizational environment and structure) vary between HSIs and non-HSIs, and how these characteristics facilitate or hinder institutions' servingness—that is, the 6-year graduation rates of the Latinx student population. To answer our questions, we conducted a panel analysis of multiple years of Integrated Postsecondary Education Data System (IPEDS) data from 1,266 institutions.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Research on HSIs has increased since their formal recognition in 1992 as a distinctive type of institution. Research has focused on the origins and evolution of HSIs, on Latinx and other minoritized groups of students' access to higher education, and on HSI students' experiences and outcomes (Garcia et al., 2019; Núñez et al., 2015). While some studies solely examined HSIs, other studies comparatively studied HSIs with non-HSIs or emerging HSIs that were approaching the 25% enrollment threshold (Cuellar, 2015; Garcia, 2013; Rodriguez & Calderón Galdeano, 2015). To date, existing studies have documented successes and transformative changes, opportunities for improvement, and capacity building about HSIs (e.g., Contreras & Contreras, 2015; Contreras et al., 2008; Cuellar, 2015; Garcia,

2013; Garcia et al., 2019; Garcia & Guzman-Alvarez, 2021; Rodriguez & Calderón Galdeano, 2015). The findings of the literature, however, appear inconsistent given the differences in how analytic samples of HSIs were constructed, variables examined, or conceptual frameworks and theories used (Núñez et al., 2015). Meanwhile, scholars have consistently stressed that HSIs have contributed to improving Latinx students' access to higher education and degree attainment for those who might not otherwise have had an opportunity to enroll in college (Gasman et al., 2015; Núñez et al., 2015).

The ability to articulate what it means for an institution to be or to become Latinx serving or minority serving in the absence of a clear mandate or mission remains a perennial challenge for higher education research, policy, and practice (Contreras et al., 2008; Garcia, 2019; Marin, 2019; Vargas & Villa-Palomino, 2019). As Garcia et al. (2019) wrote, "There continues to be a debate about what it means to serve students" (p. 745). To examine this issue, they conducted a systematic literature review to clarify the concept of servingness with respect to HSIs and Latinx students in diverse institutional contexts (e.g., 4-year, 2-year, public, private), and suggested a comprehensive, multidimensional conceptual framework of servingness. In this study, we adopted Garcia et al.'s conceptual framework to guide our research questions and estimation model.

Garcia et al.'s (2019) multidimensional conceptual framework of servingness describes indicators of servingness as measurable constructs that represent either the impact of attending or the quality of HSIs. Indicators of servingness are inclusive of both academic (e.g., GPA, 6-year graduation rates) and nonacademic (e.g., academic self-efficacy, racial

identity) outcomes of attending an HSI. In Garcia et al.'s framework, "both types of outcomes happen as a result of time spent within the structures of HSIs, and are affected by experiences, structural elements, and external forces" (p. 772). In this study, we explored the 6-year graduation rates of Latinx students at 4-year institutions as a key indicator of servingness of institutions.

For HSIs "to become truly transformative spaces of serving" (p. 772), Garcia et al. (2019) emphasized, it is important to consider the experiences of students—that is, to consider how students encounter the organizational environment of higher education institutions. To elaborate, institutional constituents such as faculty or staff can impact student experiences, including their experiences at HSIs. Garcia et al. summarized these experiences into two types: (a) validating experiences (positive) and (b) racialized experiences (negative), based on the idea of validation introduced by Rendon (1994). Validating experiences comprise, for example, "interactions with same-race/same-ethnicity peers, faculty, and staff, cultural validation, the ability to speak Spanish on campus, and mentoring, and support [that gives students] academic or social recognition or affirmation of the backgrounds of diverse students and personnel" (Garcia et al., 2019, p. 772). On the other hand, racialized experiences, such as racism, discrimination, or microaggressions, connote negative experiences within the organization. We incorporated the concepts of validating and racialized experiences in this study by accounting for the compositional diversity of students (e.g., percentages of Latinx, White, or Asian students) as well as of instructional staff, and examined how these types of student experiences are associated with Latinx students' 6-year graduation rates.

According to Garcia et al. (2019), the organizational structures of HSIs not only influence student experiences, but also "shape HSIs' capacity to address the needs of Latinx students" (p. 772). In their framework, structures for serving are, for instance, development of an institutional mission that highlights serving, adoption of diversity plans, or applying for grants to serve Latinx students. Not all structural constructs are measurable according to Garcia et al., but they can be observed and studied through case studies or documentation (e.g., through strategic plans). Given the significance of structural characteristics with respect to serving the needs of Latinx students, we investigated various types of organizational structures, including the types of student services offered (e.g., remedial education, employment services), financial aid offers at the institutional level (e.g., the average amount of grant aid per full-time equivalent [FTE] undergraduate student), and institutional expenses (e.g., instruction, research) that could play significant roles in serving Latinx students and that could impact their 6-year graduation rates.

Garcia et al. (2019), moreover, highlighted that there are external influences on the servingness of HSIs, including various historical, political, or social influences. For instance, these influences might be federal, state, or local legislation or political advocacy for the Latinx community or institutional governing boards or alumni at HSIs. In a much broader sense, Garcia et al. emphasized that there is a systemic influence of White supremacy on HSIs. We discuss how we attempt to account for these external influences in the methods section.

Most importantly, by adopting Garcia et al.'s (2019) multidimensional framework for servingness, we

move away from a tendency in prior studies to frame HSIs in binary terms as either serving or non-serving. We instead seek to illuminate the complexity of HSI identity and the diverse institutional characteristics that can contribute to their performance (Garcia et al., 2019). As Marin (2019) noted, "instead of asking whether an institution is [Latinx]-serving, it may be more appropriate to ask about the extent to which an institution is [Latinx]-serving, recognizing the ongoing identity development that may be required and the many ways [Latinx]-serving can be conveyed" (p. 178). In this regard, we investigated to what extent organizational and structural traits of higher education institutions serve Latinx students' success.

RESEARCH QUESTIONS

In this study, we aim to identify the types of institutional characteristics related to Latinx students' 6-year graduation rates with a particular interest in HSIs. We address the following three questions:

- 1| How have Latinx students' 6-year graduation trends changed at HSIs over recent years? Do these trends differ by institutional control and HSI designation status?
- 2| What are the institutional characteristics of HSIs and to what extent are they different from those characteristics at non-HSIs? What kinds of institutional differences are retained over time?
- 3| What are the institutional features of HSIs and non-HSIs that are significantly related to Latinx students' 6-year graduation rates?

METHODS

Data and Sample

We used multiple IPEDS survey components (e.g., enrollment, admissions, finance, graduation rates, institutional characteristics) to create a panel data set for this study. IPEDS data are aggregated institution-level data collected by the U.S. Department of Education's National Center for Education Statistics (NCES) from institutions that participate in the federal student financial aid programs (i.e., Title IV programs). We also used the *Digest of Education Statistics* information to gather data about the HSI status of an institution (NCES, 2019). In particular, we used data from Table 312.40, which provided a list of HSIs, their enrollment, and their awarded degree data. Since data on HSI status were not available for years prior to 2015, we focused our analysis on the years 2015–2018. The final sample for this study was limited to 4-year not-for-profit institutions that were Title IV eligible. We restricted our analysis to doctoral (research) universities, master's colleges and universities, and baccalaureate colleges; we excluded associate's colleges and special focus institutions (e.g., theological seminaries, health profession schools) as defined by the Carnegie Classification of Institutions of Higher Education (n.d.). Our aim was to keep the sample of institutions comparable in terms of the student population they serve. The final analytic sample included a total of 1,266 institutions.

Measures

All measures included in this study were aggregated at the institutional level and come from multiple

survey components of IPEDS: 12-month enrollment, admissions, finance, graduation rates, human resources, institutional characteristics, and student financial aid.³ The outcome variable we examine is the 150% graduation rates for Latinx students who enrolled at the institution as full-time, first-time degree- or certificate-seeking students. IPEDS defines 150% graduation rate as a student's completion of their program within one and a half times (150%) the normal period of time (NCES, n.d.). In our study, the outcome represented 6-year graduation rates since we focused on 4-year institutions; that outcome served as an indicator measuring the impact or quality of attending an HSI.

The key covariate of our interest was an indicator for HSI status of an institution since our analysis included both HSIs and non-HSIs. An institution was defined as an HSI by having "an enrollment of undergraduate full-time-equivalent students that is at least 25 percent [Latinx]" (NCES, 2019, Table note) who are U.S. citizens or permanent residents. Since HSI status is subject to adjustment due to yearly changes in Latinx student enrollment, an institution's HSI designation is considered as a time-varying feature, which also varies across institutions.

Furthermore, our analysis included various other institution-level measures to account for the Latinx student experience of an organizational environment as well as for the organizational structures for serving Latinx students. First, to reflect how Latinx students may experience the organizational environment, we included measures of racial and ethnic composition of the student body and the instructional staff. Due to the small number of observations, we collectively referred

to American Indian natives and Pacific Islanders as Indigenous. We also controlled for six dichotomous measures of student services/support (i.e., remedial education, academic/career counseling, employment counseling, placement, on-campus day care, physical library), financial aid offers, and six measures of institutional expenses (instruction, research, public service, academic support, student services, institutional support) to address the structures that impact institutions' organizational capacity to serve student needs; an example would be the percent spent on instruction out of the total institutional expense.⁴ For financial aid, we accounted for the average grant aid (i.e., federal, state, local, institutional, all other grant aid) per FTE undergraduate student, and we accounted for the average loan amounts per FTE undergraduate student. These characteristics are considered time-variant characteristics, meaning not only that they are different at each institution, but also that they vary across time (i.e., each year).

Finally, although they were not explicitly discussed within Garcia et al.'s (2019) framework, we descriptively examined institutional characteristics that might be associated with student outcomes such as the total cost of attendance, institutional control, institutional selectivity measured by the percentage of admitted students, and Carnegie classification of the institution. Except for selectivity, all of these characteristics were time-invariant covariates.

3. More information about survey components can be found at IPEDS (n.d.-a).

4. Descriptions of student services can be found at IPEDS (n.d.-b).

Empirical Strategy

We first conducted descriptive analyses to examine the trends in Latinx students' 6-year graduation rates by institutional control and HSI status, as well as to examine the similarities and differences in institutional characteristics between HSIs and non-HSIs. T-tests (for continuous variables) and chi-squared tests (for categorical variables) were also performed to confirm if the differences across institutions were statistically meaningful by their HSI status.

To answer our primary research question about the types of institutional characteristics related to Latinx students' 6-year graduation rates, we conducted a panel analysis of IPEDS data from 2015 to 2018. We considered each of the participating Title IV institutions as the unit of analysis (Jaquette & Parra, 2014) measured at different points in time (e.g., 2015, 2016), and we identified the panel structure of the data accordingly. We estimated a fixed effects model given the result of a Hausman test, which indicated that it was the preferred model rather than a random effects model ($p < 0.05$). In our analysis, we used the *xtreg* command in *Stata* that demeans the variables, and we estimated the standard errors, correctly accounting for the fact that the cases are not independent of each other. Given the continuous outcome variable, our linear regression panel model with fixed effects can be written as

$$y_{it} = \beta_0 + \beta_1 X_{it} + a_i + \lambda_t + \varepsilon_{it}$$

y_{it} is the outcome, a continuous measure of Latinx students' 6-year graduation rate for each institution (i) at time point ($t = 2015, 2016, 2017, 2018$). β_0 is an intercept term that can vary at different time periods. X_{it} is a set of time-varying covariates such as the proportion of Latinx students, faculty-student

ratio, institutional selectivity, financial aid offers, or institutional expenses. a_i is an institution fixed effect (i.e., institution dummy variables) that controls for all time-invariant unobserved institution-specific characteristics that might affect the outcome, such as institutional climate. This means that a_i absorbs the impacts of all time-constant institutional characteristics that have not been included in our model. λ_t is a time-fixed effect (i.e., year) that controls for unobservable covariates that vary over time but are fixed across institutions. Finally, ε_{it} is an error term that is different for each institution at each time period (e.g., 2015, 2016), and represents the effects of all time-variant variables that have not been included in our model.

Limitations

There were some aspects of Garcia et al.'s (2019) framework that were not observable through our data. Mainly, we were not able to account for some of the structural factors that, "unlike other outcomes and experiences, [are not] necessarily measurable in traditional ways" (Garcia et al., 2019, p. 773), such as mission and value statements or diversity plans. We attempted to mitigate this limitation by accounting for institutional characteristics such as control or institution type, since these characteristics reflect institutions' orientation (e.g., teaching vs. research) or diversity goals, to some extent; those characteristics do not vary over time in most cases. We also could not account for any external influences, such as White supremacy, discussed by Garcia et al. Yet, all institutions we examined were domestic institutions that were potentially being impacted by such external factors to a similar extent, and so should not impact our estimates significantly.

FINDINGS

Trends in 6-Year Graduation Rates for Latinx Students

Table 1 and Figure 1 illustrate the trends in 6-year graduation rates for Latinx students by institutional control and HSI status. We found that, between 2015 and 2017, the average 6-year graduation rates for Latinx students were steady, without any significant change. The rates, however, suddenly dropped in 2018 with greater changes among private institutions, which generally had higher 6-year graduation rates for Latinx students than public institutions had. We also discovered that, on average, private non-HSIs had the highest and public HSIs had the lowest 6-year graduation rates for Latinx students throughout the years.

Table 1. 6-Year Graduation Rates for Latinx Students: 2015–2018

	2015	2016	2017	2018
Public HSI	38.01	37.18	38.96	34.75
Private HSI	44.88	44.80	45.57	36.89
Public Non-HSI	41.50	41.91	41.03	36.80
Private Non-HSI	51.94	52.05	53.81	46.70

Differences in Institutional Characteristics between HSIs and Non-HSIs

As shown in Table 2, HSIs and non-HSIs appeared to have meaningful differences in their institutional characteristics. In terms of the outcome, HSIs, on average, had between 5 to 7 percentage points lower 6-year graduation rates for Latinx students than non-HSIs (e.g., 39.2% for HSIs and 45.9% for non-HSIs). This trend held for the years 2015 through 2018.

Figure 1. Latinx Student's 6-Year Graduation Rates, 2015–2018

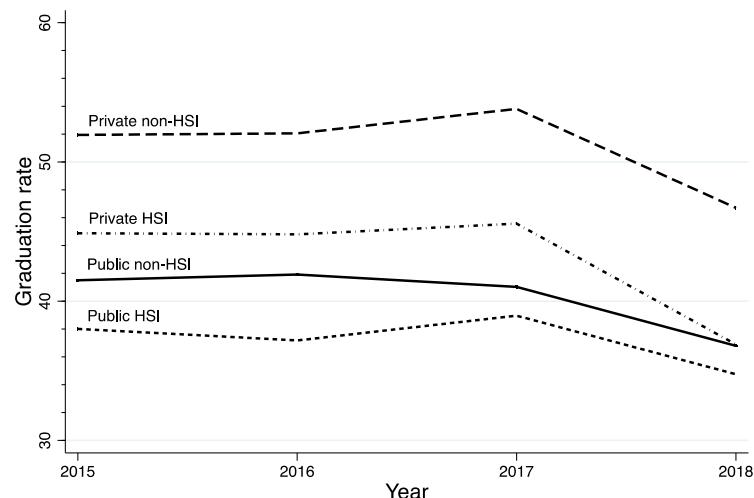


Table 2. Differences in Institutional Characteristics Between HSIs and Non-HSIs: 2015–2018

Variables	2015												2016												2017												2018											
	HSIs						Non-HSIs						HSIs						Non-HSIs						HSIs						Non-HSIs						HSIs						Non-HSIs					
	N	M.	S.D.	N	M.	S.D.	N	M.	S.D.	N	M.	S.D.	N	M.	S.D.	N	M.	S.D.	N	M.	S.D.	N	M.	S.D.	N	M.	S.D.	N	M.	S.D.	N	M.	S.D.	N	M.	S.D.	N	M.	S.D.	N	M.	S.D.						
Outcome	6-yr graduation rate+	96	44.1	15.8	1182	50.3	24.0	88	43.9	15.1	1195	50.8	23.0	107	46.1	16.3	1179	51.3	23.9	117	39.2	19.2	1184	45.9	22.7	2018	2017	2016	2015	Variables	Student Body	Instructional Staff	Cost & Aid (unit: \$1K)	Cost of attendance+	Average grant aid+	Average loan												
% White+	101	29.5	14.3	1220	60.6	21.1	91	28.5	13.1	1223	59.6	21.1	109	28.9	13.3	1209	59.3	21.0	121	29.1	13.3	1204	58.8	21.0	% White+	% Asian+	% Black	% Latinx+	% Indigenous	% Multiracial	% Unknown	% International	Cost of attendance+	Average grant aid+	Average loan													
% Asian+	101	8.1	8.1	1220	3.2	5.1	91	6.7	7.1	1223	3.5	5.4	109	7.1	7.6	1209	3.5	5.3	121	6.8	7.2	1204	3.6	5.3	% White+	% Asian+	% Black	% Latinx+	% Indigenous	% Multiracial	% Unknown	% International	Cost of attendance+	Average grant aid+	Average loan													
% Black	101	10.0	8.3	1220	14.0	20.8	91	10.6	8.7	1223	13.7	20.2	109	10.8	8.8	1209	13.8	20.1	121	11.0	9.2	1204	13.9	20.1	% White+	% Asian+	% Black	% Latinx+	% Indigenous	% Multiracial	% Unknown	% International	Cost of attendance+	Average grant aid+	Average loan													
% Latinx+	101	38.4	15.8	1220	6.5	5.7	91	40.0	15.6	1223	7.2	6.7	109	38.7	15.1	1209	7.4	6.5	121	38.3	14.8	1204	7.7	6.6	% White+	% Asian+	% Black	% Latinx+	% Indigenous	% Multiracial	% Unknown	% International	Cost of attendance+	Average grant aid+	Average loan													
% Indigenous	101	0.5	1.2	1220	0.4	1.8	91	0.5	1.1	1223	0.4	1.8	109	0.5	1.0	1209	0.4	1.8	121	0.5	1.2	1204	0.5	1.8	% White+	% Asian+	% Black	% Latinx+	% Indigenous	% Multiracial	% Unknown	% International	Cost of attendance+	Average grant aid+	Average loan													
% Multiracial	101	2.3	1.9	1220	2.4	2.4	91	2.4	2.1	1223	2.6	2.4	109	2.6	2.2	1209	2.8	2.4	121	2.7	2.2	1204	3.0	2.5	% White+	% Asian+	% Black	% Latinx+	% Indigenous	% Multiracial	% Unknown	% International	Cost of attendance+	Average grant aid+	Average loan													
% Unknown	101	4.0	4.3	1220	5.3	6.8	91	4.5	5.0	1223	5.1	6.6	109	4.4	4.7	1209	5.0	6.8	121	4.3	4.1	1204	4.8	6.6	% White+	% Asian+	% Black	% Latinx+	% Indigenous	% Multiracial	% Unknown	% International	Cost of attendance+	Average grant aid+	Average loan													
% International	101	3.3	3.2	1220	3.8	4.8	91	2.9	2.5	1223	4.0	4.9	109	3.3	3.1	1209	4.0	4.8	121	3.2	2.9	1204	4.0	4.8	% White+	% Asian+	% Black	% Latinx+	% Indigenous	% Multiracial	% Unknown	% International	Cost of attendance+	Average grant aid+	Average loan													

Services/Support[^]																								
Remedial+	101	81.2	0.4	1225	65.8	0.5	91	79.1	0.4	1228	65.9	0.5	109	79.8	0.4	1214	64.9	0.5	121	80.2	0.4	1209	64.0	0.5
Counseling	101	100.0	0.0	1225	99.8	0.0	91	100.0	0.0	1228	99.9	0.0	109	100	0.0	1214	99.9	0.0	121	100.0	0.0	1209	99.9	0.0
Employment	101	97.0	0.2	1225	95.8	0.2	91	96.7	0.2	1228	96.0	0.2	109	97.2	0.2	1214	95.9	0.2	121	98.3	0.1	1209	96.1	0.2
Placement	101	83.2	0.4	1225	88.7	0.3	91	85.7	0.4	1228	88.6	0.3	109	86.2	0.3	1214	88.1	0.3	121	87.6	0.3	1209	87.7	0.3
Campus day care+	101	48.5	0.5	1225	27.6	0.4	91	49.5	0.5	1228	27.7	0.4	109	48.6	0.5	1214	27.1	0.4	121	46.3	0.5	1209	26.5	0.4
Library (physical)	101	99.0	0.1	1225	98.6	0.1	91	98.9	0.1	1228	98.9	0.1	109	99.1	0.1	1214	99.0	0.1	121	97.5	0.2	1209	99.4	0.1
Institutional Expense																								
% Instruction	100	42.6	8.1	1214	43.2	8.5	90	41.6	8.6	1224	42.6	8.7	108	41.4	8.8	1210	42.3	8.7	119	39.3	8.3	1199	41.7	8.8
% Research	100	3.8	7.6	1214	4.2	8.3	90	4.0	7.5	1224	4.1	8.1	108	3.7	6.9	1210	4.1	8.2	119	4.0	7.2	1199	4.1	8.1
% Public service	100	2.3	4.6	1214	2.4	4.2	90	2.4	4.8	1224	2.3	4.1	108	2.2	4.5	1210	2.3	4.2	119	2.0	4.3	1199	2.3	4.1
% Academic support	100	11.2	4.4	1214	10.7	4.6	90	11.0	4.8	1224	10.5	4.6	108	10.7	5.1	1210	10.6	4.6	119	10.4	4.5	1199	10.6	4.8
% Student service+	100	14.1	6.4	1214	16.1	8.0	90	14.0	6.7	1224	16.2	8.1	108	14.6	7.5	1210	16.4	8.2	119	14.3	7.9	1199	16.7	8.4
% Institution support	100	17.3	7.8	1214	19.4	8.0	90	18.0	8.3	1224	19.3	8.1	108	17.7	8.2	1210	19.3	8.1	119	17.4	8.8	1199	19.2	8.1
Other																								
Enrollment+ (unit: 1k)	101	11.1	11.1	1220	6.6	8.4	91	10.1	11.0	1223	6.8	8.6	109	10.2	11.4	1209	6.8	8.8	121	11.1	12.8	1204	6.6	8.5
% Admitted	100	67.5	19.3	1214	66.9	20.4	89	68.4	19.2	1217	66.4	20.3	109	68.5	21.8	1214	66.8	21.5	118	72.0	19.1	1192	67.8	21.0
% Private+	101	43.6	0.5	1225	63.6	0.5	91	46.2	0.5	1228	63.0	0.5	109	48.6	0.5	1214	63.0	0.5	121	47.1	1.0	1209	63.5	0.5
% Baccalaureate+	16	15.8	—	499	40.7	—	16	17.6	—	495	40.3	—	22	20.2	—	489	40.3	—	27	22.3	—	488	40.4	—
% Master's	66	65.4	—	495	40.4	—	57	62.6	—	501	40.8	—	67	61.5	—	495	40.8	—	70	57.9	—	495	40.9	—
% Doctoral	19	18.8	—	231	18.9	—	18	19.8	—	232	18.9	—	20	18.4	—	230	19.0	—	24	19.8	—	226	18.7	—

+ Variables with consistently significant difference ($p < 0.05$) between HSIs and non-HSIs throughout 2015 and 2018. T-tests and chi-squared tests were conducted for continuous and categorical variables, respectively.

^ Mean values for categorical variables can be interpreted as relative frequencies.

The demographic makeup of the student body differed between HSIs and non-HSIs. As anticipated, HSIs had higher proportions of Latinx students than non-HSIs (e.g., 38.3% vs. 7.7% in 2018). The proportion of White students was substantially lower at HSIs, with 29.1% in 2018 versus 58.8% at non-HSIs. Moreover, the proportion of Asian students attending HSIs was also about twice the proportion as at non-HSIs (e.g., 6.8% at HSIs vs. 3.6% at non-HSIs in 2018). These differences were statistically significant between HSIs and non-HSIs throughout the years in our analysis. For other race/ethnic groups, including Black, Indigenous, multiracial, and international students, the proportions are approximately the same at HSIs and non-HSIs.

HSIs also differed from non-HSIs in their racial and ethnic composition of the full-time instructional staff, with smaller proportions of White instructors (e.g., 65.1% at HSIs compared to 75.8% at non-HSIs in 2018). HSIs had a higher proportion than non-HSIs of instructors who were Latinx (10.2% at HSIs vs. 2.6% at non-HSIs in 2018) and a higher proportion of Asian instructors (e.g., 9.3% at HSIs compared to 6.3% at non-HSIs in 2018). Other demographic groups, including Black, Indigenous, and international, were equally represented among instructional staff at HSIs and non-HSIs, as were instructors of unknown race/ethnicity. These trends held throughout the years we examined.

HSIs were also distinct from non-HSIs in their financial aid profile. The average cost of attendance was higher at non-HSIs than at HSIs by about \$5,000 to \$7,000. However, this was offset by differences in grant aid for enrolled students: non-HSIs offered higher grant aid awards than HSIs (e.g., \$16,400 at non-HSIs compared to \$12,400 at HSIs in 2018), with statistical significance between years 2015 and 2018.

When examining student support services, we observed that HSIs offered more services accommodating nontraditional and adult learners. While nearly half of HSIs reported having on-campus day-care services for students with young children, only about one fourth of non-HSIs in our sample provided campus day care. This difference was statistically significant throughout all years. HSIs also had more remedial offerings, with around 80% of these institutions providing remedial courses, compared to about 65% of non-HSIs. Moreover, non-HSIs reported spending a greater proportion of core institutional expenses on student services than did HSIs. However, among other types of services, we observed similarities between HSIs and non-HSIs: student counseling services, employment services, and campus libraries were nearly universal among both HSIs and non-HSIs. More than 80% of campuses offered placement services for graduating students, with no significant differences between HSIs and non-HSIs.

We also found several differences between the sector and size of HSIs compared to non-HSIs. HSIs were larger on average, enrolling about 5,000 more students at each campus than the non-HSIs in our sample enrolled. While the majority of non-HSIs in our sample were private colleges and universities (63.5% in 2018), fewer than half of HSIs were private (47.1%). The level of degree offerings also differed between HSIs and non-HSIs. HSIs included fewer baccalaureate degree-granting institutions but more master's degree-granting institutions, when compared to non-HSIs.

Institutional Characteristics and 6-Year Graduation Rates for Latinx Students

Table 3 presents the findings from the panel analysis of the relationship between institutional characteristics and Latinx students' 6-year graduation rates for (a) all institutions, (b) HSIs only, and (c) non-HSIs only. The first column reports the estimates for the full population of colleges and universities in our sample. We found that HSI status of an institution was not a statistically significant predictor of Latinx students' 6-year graduation rate, all else being equal. However, among the other institutional characteristics, student demographic characteristics and institutional services offered were predictive of the Latinx graduation rate.

For each additional percentage-point increase in the proportion of multiracial students, the 6-year graduation rates for Latinx students decreased by 0.83 percentage points, controlling for all other covariates. Among the student services offered, both remedial classes and academic/career counseling were predictive of lower Latinx graduation rates, with the provision of remedial services associated with a 5.12 percentage points lower Latinx students' 6-year graduation rate, holding all else constant, and academic counseling associated with a 22.73 percentage points lower rate. Career placement services were predictive of higher Latinx students' 6-year graduation rates, with this student service offering associated with 5.04 percentage points higher rate, all else equal.

Table 3. Panel Analysis Results (Outcome: 6-Year Graduation Rates for Latinx Students)

Variables	All		HSIs		Non-HSIs	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
HSI status	-1.54	(1.44)				
Student body						
% White	-0.07	(0.31)	-0.61	(0.60)	-0.10	(0.33)
% Asian	0.75	(0.51)	-0.88	(0.82)	0.91	(0.56)
% Black	0.05	(0.36)	-0.03	(0.77)	0.03	(0.39)
% Latinx	-0.02	(0.34)	-1.06*	(0.57)	-0.04	(0.40)
% Native	1.05	(1.11)	-1.90	(1.70)	1.46	(1.24)
% Multiracial	-0.83*	(0.45)	-1.24	(1.08)	-0.76	(0.47)
% Race unknown	0.17	(0.32)	-0.88	(0.56)	0.15	(0.34)
% International	-0.09	(0.34)	-1.22*	(0.65)	-0.08	(0.37)
Instructional staff						
% White	-0.34	(0.28)	-0.23	(0.65)	-0.32	(0.31)
% Asian	-0.08	(0.34)	0.64	(0.71)	-0.15	(0.37)
% Black	-0.51	(0.35)	0.43	(0.82)	-0.48	(0.37)
% Latinx	-0.37	(0.37)	-0.46	(0.66)	-0.34	(0.43)
% Native	-0.41	(0.46)	-0.33	(0.87)	-0.39	(0.48)
% Multiracial	0.00	(0.33)	-0.60	(0.68)	0.04	(0.36)
% Race unknown	-0.25	(0.28)	-0.61	(0.64)	-0.22	(0.30)
% International	-0.39	(0.30)	0.01	(0.61)	-0.45	(0.33)
Cost & aid (unit: 1K)						
Cost of attendance	0.06	(0.18)	-0.36	(0.28)	0.11	(0.20)
Average grant aid	-0.02	(0.19)	0.20	(0.35)	-0.07	(0.20)
Average loan	-0.15	(0.44)	0.24	(0.45)	-0.19	(0.48)

Services/support						
Remedial	-5.12*	(2.83)	-23.00***	(2.92)	-4.85	(3.01)
Academic/career counseling	-22.73**	(9.49)	-	-	-23.59**	(9.66)
Employment services	0.93	(9.29)	-	-	0.67	(9.42)
Placement services	5.04***	(1.91)	-0.90	(3.08)	5.84***	(2.06)
On-campus day care	-0.13	(2.55)	-2.06	(1.63)	-0.14	(2.83)
Library	-6.71	(5.47)	-	-	-7.47	(5.81)
Institutional expense						
% Instruction	-0.25	(0.33)	0.64	(0.53)	-0.34	(0.36)
% Research	-0.20	(0.36)	1.11*	(0.59)	-0.32	(0.39)
% Public service	-0.03	(0.42)	-0.27	(0.70)	0.06	(0.46)
% Academic support	0.37	(0.37)	1.85***	(0.58)	0.26	(0.40)
% Student service	-0.21	(0.36)	0.24	(0.64)	-0.24	(0.39)
% Institution support	0.09	(0.33)	0.93*	(0.54)	0.03	(0.36)
% Other	-0.06	(0.33)	0.73	(0.54)	-0.12	(0.36)
Other						
Enrollment (unit: 1K)	-0.00	(0.00)	0.00	(0.00)	-0.00	(0.00)
Selectivity (% admitted)	0.06	(0.04)	0.04	(0.06)	0.06	(0.05)
Year 2016 (reference: 2015)	0.46	(0.63)	1.44	(1.05)	0.35	(0.67)
Year 2017	1.12	(0.79)	3.70**	(1.78)	0.90	(0.84)
Year 2018	-4.43***	(0.97)	-1.92	(2.95)	-4.63***	(1.03)
Constant	119.22**	(51.47)	79.85	(96.81)	127.27**	(55.57)
Observations	4,968		371		4,597	
R-squared (within)	0.04		0.34		0.04	
Number of institutions	1,266		117		1,189	

*** p < 0.01, ** p < 0.05, * p < 0.1

Note: In the analysis of the subsample of HSIs, omitted variables occur because they are time-invariant in this group.

Among the sample of HSI institutions only, we found marginally significant estimates among student demographic characteristics. Each additional percentage point of Latinx student enrollment was associated with about 1 percentage point lower 6-year graduation rate, holding all else constant; the same was true of each additional percentage point of international student enrollment. For the indicator variables of student and support services, we found that provision of remedial services was associated with 23 percentage points lower Latinx students' 6-year graduation rate, holding all else constant.

We also found that institutional expenditures were predictive of Latinx students' 6-year graduation rates. Higher 6-year graduation rates were marginally associated with higher spending on research and institutional support (i.e., executive-level administration, legal, and fiscal operations) and on central facilities and space management. Spending on academic support was associated with higher Latinx students' 6-year graduation rates, with each additional percentage point of spending predicting 1.85 percentage points higher graduation rates, holding all else constant.

We discovered that the relationship between institutional characteristics and Latinx students' 6-year graduation rates at HSIs appeared to be different among non-HSIs. Among non-HSIs, only several student services and support provisions were related to Latinx students' 6-year graduation rates. All else being equal, an offering of academic counseling was associated with 23.59 percentage points lower 6-year graduation rate for Latinx students, while career placement services were positively associated with Latinx students' 6-year graduation rates, with 5.84 percentage points higher rate for each additional percentage point increase, all else equal.

DISCUSSION AND CONCLUSION

The primary goals of this study were to better understand the meaning of servingness in the context of HSIs and to determine the extent to which HSIs serve Latinx students in terms of their 6-year degree attainment at not-for-profit 4-year institutions. Using a multidimensional conceptual framework of servingness proposed by Garcia et al. (2019), we defined our outcome and the key institution-level factors that could be associated with the outcome. We first examined trends in 6-year graduation rates for Latinx students from 2015 to 2018; findings showed that public HSIs had the lowest 6-year graduation rates for Latinx students over the years while private non-HSIs had the highest rates. More broadly, public institutions (both HSIs and non-HSIs), on average, had lower 6-year graduation rates for Latinx students than private institutions. By HSI-designation status, even after accounting for all other characteristics, the average Latinx students' 6-year graduation rates were significantly lower for HSIs than for non-HSIs.

Moreover, Latinx students' 6-year graduation rates were generally lower than 50% at private HSIs, public HSIs, and public non-HSI institutions from 2015 to 2017, while private non-HSIs had graduation rates slightly higher than 50%. Our overall findings (i.e., below 50%) were consistent with previously reported rates (e.g., Contreras & Contreras, 2015; Perez, 2020). Intriguingly, we also observed that 6-year graduation rates for Latinx students suddenly decreased in 2018 compared to previous years for all types of institutions regardless of HSI status or institutional control. We assumed that there could have been an external influence on institutions' capacity to serve Latinx students. For instance, in September 2017 the U.S. Department of Homeland Security issued a memo, "Memorandum on Rescission of Deferred Action for Childhood Arrivals (DACA)," announcing the government's intention to wind down the DACA program. According to Garcia et al. (2019), political or legal contexts can influence institutions' ability to serve Latinx students. Future research is needed to examine whether these types of changes in institutions' external policy environment have long-term consequences for serving Latinx students in higher education institutions.

We further delved into understanding the similarities and differences between HSIs and non-HSIs regarding the organizational environment that impacts student experiences (e.g., Latinx percentage of student body) and, moreover, how these institutional characteristics were associated with Latinx students' 6-year graduation rates. Our results demonstrated that HSIs had significantly larger proportions of Asian and Latinx students and lower proportions of White and Black students than did non-HSIs. In particular, the percentage of Latinx students at HSIs was nearly 5.4 times higher than at non-HSIs. However, all else being equal, the

ratio of Latinx students had a marginally significant and negative impact on Latinx students' 6-year graduation rates at HSIs. Although previous scholars have emphasized the importance of student experiences with same-race or same-ethnicity peers (Garcia et al., 2019), our result suggests that peer effects might not apply in the same way for this outcome, although we did not examine other academic outcomes such as grades or retention. The data in our analysis do not show a statistically meaningful relationship between the proportion of Latinx students and their 6-year graduation rates at non-HSIs. This might be attributable to the fact that non-HSIs have a much lower proportion of Latinx students, which limits the impact of Latinx student body on Latinx student outcomes.

HSIs had a significantly higher percentage of Latinx instructional staff (about 4.8 times higher) than non-HSIs. However, contrary to expectations, the proportion of Latinx instructional staff did not have a significant association with Latinx students' 6-year graduation rates either among students at HSIs or in the full sample. While prior studies (e.g., Hurtado et al., 2015) showed that a representative faculty could have positive effects on Latinx student outcomes, our findings suggest that, at HSIs with a large proportion of Latinx peers, a larger proportion of Latinx instructional staff might have a limited contribution to Latinx students' 6-year graduation rate. This result could show the nuances of validating experiences for Latinx students (Garcia et al., 2019). Latinx students at HSIs may find more profound validating experiences through peer interactions than through staff interaction because the former interactions occur more frequently.

Using Garcia et al.'s (2019) framework of servingness, this study also focused on the impact of institutions'

structural capacity (e.g., institutional expenditures and student services) to serve Latinx students. We investigated student services offerings, financial aid, and institutional expenses at HSIs and non-HSIs, and analyzed how these factors were associated with Latinx students' 6-year graduation rates. We discovered that a greater proportion of HSIs offered remedial education, employment services, and on-campus day care than did non-HSIs, and that the average cost of attendance was covered by higher percentages of Pell Grants and loans at HSIs than at non-HSIs. The offering of remedial services was a significant and substantively large predictor of lower Latinx graduation rates in both the HSI institutions and in the full sample. However, this was not a causal effect in which remedial services led to poorer academic outcomes. Instead, this likely reflects the fact that institutions serving students with high levels of need for academic support are both more likely to offer remedial support and more likely to have lower graduation rates for all students. Among the other student services, for the full sample we also found that academic/career counseling was associated with lower Latinx students' 6-year graduation rates, while placement services were associated with higher rates, a finding that was consistent for the non-HSI sample. Career placement services could increase students' motivation to complete their degrees, given the promise of gainful employment awaiting them after graduation.

HSIs' expenses on instruction, research, student services, and institutional support also accounted for significantly lower percentages of the total institutional expense than non-HSIs. Our findings demonstrated that HSIs were distinguishable from non-HSIs in various aspects such as the types of student support (i.e., types of student need) or institutional spending emphasized by

institutions; in addition, our findings highlighted that it is inappropriate to compare the two types of institutions without context (Rodriguez & Calderón Galdeano, 2015). In terms of the predictive capacity of institutional spending measures, we found that additional spending on research and academic support was associated with higher Latinx students' 6-year graduation rates at HSI institutions; that was not the case in the overall sample. Overall, we conclude that these structural features are generally associated with institutional selectivity as well as with the financial capacity to provide an academic environment and support for student success; these features have an important impact on Latinx students' 6-year graduation rates at 4-year institutions.

In summary, framing servingness at HSIs as an organizational and structural issue allows for focus on institutions as the unit of analysis to identify needs for strengthening their capacity to serve Latinx students (Garcia, 2017, 2019; Garcia et al., 2019). To that end, leaders, decision makers, and policymakers must be clear in their words and actions about what it means to serve Latinx students and to identify the types of resources needed for their success (Garcia, 2019; Vargas & Villa-Palomino, 2019). For instance, securing financial resources such as federal or state funding to support Latinx

students should continue to be a key focus for institutional leaders. Moreover, such support should result in greater capacity for serving Latinx students to improve and sustain positive academic and nonacademic student outcomes (Garcia et al., 2019; Perez, 2020; Vargas et al., 2020). Namely, HSIs must recognize that these students are the reason why institutions are designated as such and why they are eligible for targeted federal funding (Vargas & Villa-Palomino, 2019).

Future research should continue to build on existing empirical evidence to understand how HSIs are evolving due to their defining characteristics of Latinx student enrollment and how such changes are impacting institutional capacity to serve Latinx students. Longitudinal studies can particularly highlight how HSIs are contributing to the overall higher education ecosystem. As colleges and universities look to find novel ways to increase enrollment and graduation rates for underrepresented students, research that continues to examine the types of institutional characteristics can uncover trends and patterns that could contribute to institutional success. It is imperative that studies continue to investigate which characteristics of HSIs contribute to the success of Latinx students in particular, and how and why these characteristics matter.

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